POSTER SESSION

1090

Ablation for Supraventricular Arrhythmias

Monday, March 08, 2004, Noon-2:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1090-213 The Sinus Nodal Tissue Arrangement Into the Musculature of the Terminal Crest: Implications in Ablation of Inappropriate Sinus Node Tachycardia?

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Treatment of inappropriate sinus node tachycardia (IST) with radiofrequency (RF) catheter ablation has lower success rates than those attained in other atrial tachycardias. Methods: In 47 normal human heart specimens (49±20 years; 31 male),we examined the shape and dimensions of the SN by histological sections and scanning electron micrographs containing the superior cavo-atrial junction.Results. Thickness of the terminal crest ranged from 3-10 mm. The SN is generally irregular and fusiform in shape with the uppermost portion described as the head, followed by the body and a tapering tail. In the majority of cases the long axis of the sinus node was parallel to the terminal groove. The nodal cells always within a matrix of connective were arranged as interlacing strands of specialized myocytes that are smaller than working atrial myocytes. The tail of the sinus node in 61% of specimens was separated by fibrous tissue into islands of specialised cells. Short nodal extensions could be traced in most of the hearts passing superiorly (0.5 to 1.5 mm in length) towards the superior vena cava (18 specimens, 38%) and inferiorly (0.3 to 2.3 mm in length) ending in the subepicardium (12 specimens, 25%) or deeper into the ordinary myocardium (26 specimens, 55%).
Conclusions: The sinus nodal tissue tends to be non-uniform in shape with irregular extensions and branching into the musculature of the terminal crest. These findings probably accounts for the difficulties during RF ablation of IST.

Dimensions of the sinus node (mm)

	Length	Width	Thickness
Head	2.2±1.2 (1-4)	2.4±0.7 (1-3.5)	1.2±0.3 (0.5-2.2)
Body	9.5±2.3 (6-14)	5.3±1.5 (2.2-8.3)	1.5±0.5(0.5-3.5)
Tail	1.6±0.5(1-3.5)	1.1±0.2(0.4-1.5)	0.4±0.1(0.1-0.9)

1090-214 Contribution of Epicardial Mapping and Ablation to Treatment of Patients With Previously Failed Accessory Pathway Ablations

Miguel Valderrabano, David A. Cesario, Sen Ji, Kevin Shannon, Isaac Wiener, Charles D. Swerdlow, Kalyanam Shivkumar, UCLA Medical Center, Los Angeles, CA

Background: Radiofrequency (RF) ablation has a cure rate > 90% for accessory pathway (AP)-mediated tachycardias. Catheter instability, inadequate access to sites of interest and epicardial APs cause ablation failures. We investigated a combined transthoracic epicardial and endocardial approach for failed AP ablations. *Methods and Results:* We reviewed 5 AP ablations obtained from 4 patients with failed ablation attempts (median 2, range 1-4). Endocardial mapping of AP was performed using conventional techniques. Sites with local electrograms suggestive of AP location were selected. Percutaneous transthoracic pericardial puncture was performed via a subxiphoid approach, an 8F sheath was inserted into the pericardium and an ablation catheter was positioned in the epicardial aspect of the putative AP location for epicardial-endocardial electrogram comparison. Endocardial RF energy was applied to locations with AP potentials or the best electrogram timing. Epicardial RF applications were performed when endocardial applications failed. Coronary arteriography was performed to assess proximity of coronary arteries to the ablation catheter. APs were located in the right free wall (2), right posteroseptal (2) and midseptal (1). In 2 cases, the earliest ventricular activation during orthodromic tachycardia was present in the epicardial electrogram, and AP ablation was only successful with epicardial RF application, either alone or with simultaneous endocardial-coronary sinus and epicardial delivery (1 case). In 2 cases, AP ablation was achieved with endocardial RF application (optimal site location was guided by epicardial mapping).All APs were successfully ablated. *Conclusions:* A combined endocardial-epicardial approach is useful in previously failed AP ablations. Epicardial mapping permits accurate AP localization for both epicardial and endocardial ablation.

1090-215 Safety and Efficacy of Freezor MAX, A New 9FR, 8mm Tip Cryoablation Catheter for the Treatment of Atrial Flutter

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Background: A new 9FR, 8mm tip, 66mm curve, quadripolar (3-5-2) cryo catheter, Freezor® MAX [MAX] (CryoCath, Kirkland, Canada), recently received CE Mark approval. It is designed for use in cardiac ablation where sizeable, yet focussed lesions, are required, such as for atrial flutter (AFl). Increased cooling to approximately –80C and better tip - tissue contact, produce lesions 40% deeper than the 7FR 6mm tip predecessor, Freezor® Xtra (Xtra). **Method:** We investigated the safety and efficacy of MAX for the treatment of AFl in 23 consecutive patients (pts), 17 (74%) male, with mean ± SD age and arrhythmia duration of 62.7 ± 11.4 and 5.1 ± 6.2 years, respectively. 20 pts had common AFl and 3 had uncommon AFl. EP mapping with diagnostic catheters was performed throughout the procedure. The site for isthmus block was identified with a test freeze of <60s, with complete block usually observed within the first 20s of the 4 minute cryo ablation. **Results:** Acute cryo success with MAX was achieved in 22 [95.7%] of 23 pts, however, success was achieved in all 20 (100%) patients with common AFl. We compared our MAX data with those from 98 consecutive AFl pts treated at our centre with Xtra. Statistically significantly fewer ablations ($p < 0.001$), 5 ± 4 vs. 17 ± 20, as well as statistically significantly shorter ($p = 0.004$) fluoroscopy times, 17 ± 13 vs. 26 ± 13 mins, were required to successfully ablate the isthmus with MAX. There were no complications in any of the 23 pts and, of special note, no cryo energy induced AV block. All pts remained completely discomfort free during cryo energy delivery. **Conclusion:** Acute success with MAX in the 20 common AFl pts is 100%. Fluoroscopy time and the number of ablations are statistically and clinically significantly reduced with MAX compared with Xtra. There were no adverse events in our patient population. Our early acute experience suggests that MAX is a safe, efficacious and improved catheter for the ablation of AFl.

1090-216 Acute Resumption of Conduction in the Cavotricuspid Isthmus After Catheter Ablation of Common Atrial Flutter: Impact of Isthmus Anatomy

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Cavotricuspid isthmus conduction (CIC) is closely associated with the recurrence of atrial flutter (AFL) and acute resumption of CIC is not unfrequent. **Objectives.** The aim of this study was [1] to evaluate the prevalence of acute CIC resumption and [2] to identify its predictors. **Methods.** Over 17 months, 219 pts with AFL were considered eligible; 185 pts (67±11 years; 32 females) accepted the protocol and underwent an isthmogram in preparation for RFA (right atrium angiography). We analyzed CTI length and CTI morphology was classified as straight, concave or with a pouch-like recess. RFA was performed with an 8-mm-tip catheters or a cooled-tip catheter. The end-point was a bidirectional block validated after a 30 minutes waiting period. **Results:** Patients characteristics were as follows: history of AFib before ablation (86/185), structural heart disease (77/185), LVEF (58±12%), left atrial size (43±7 mm), average CTI dimension (32±7 mm). CTI morphology was as following: straight (n=108); concave (n=44); pouch-like recess (n=33). Bi-directional block was obtained in 99% with a mean RF application time of (12.8±13 min) and mean fluoroscopic time (14±13 min). During an observation of 30 minutes, the incidence of acute CIC restoration was 36/185 (19.5%) (mean time of 14±9 min). Among all clinical and anatomic factors tested (age, gender, structural heart disease, history of AFib, left atrial size, CTI dimension, left ventricular ejection fraction, right atrium length, systolic pulmonary arterial pressure, significant tricuspid regurgitation, cavo-tricuspid morphology, AFL recurrence), the only predictive factor was the presence of an abnormal isthmus morphology [concave or pouch-like recess vs. straight aspect]: 24/77 [31%] vs. 13/108 [12%] (p=0.0025). After a mean follow-up of 9.5±5 months, AFL recurred in 4/185 patients (2.2%), atrial fibrillation appeared in 13% (24/185) and atrial tachycardia in one. **Conclusions.** The prevalence of CIC is ≈20% and the only predictive factor of acute CIC resumption is the presence of an abnormal isthmus morphology (concave aspect or pouch-like recess). Thus, a careful observation is required in this subset immediately after AFL ablation.

1090-217 Do Single Cryothermia Applications of Less Than Five Minutes Produce Permanent Cavotricuspid Isthmus Block in Humans?

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Background: Previous animal studies showed that a cryothermia application needs to be 5 minutes and repeated twice on the same site to create a permanent cryolesion. The aim of this study was to compare single-3-minutes (Single-3) with double-3-minutes (Double-3) cryothermia applications for the treatment of atrial flutter (AFL).
Methods: Forty patients (56 ± 13 years; 33 men) with common AFL were randomized to Single-3 (n = 20) or Double-3 (n = 20) cryothermia applications at each site along the cavotricuspid isthmus. Cryoablation was performed with the CryoCor cryoablation system. Half of the patients had a structurally normal heart. The mean AFL cycle length was 229 ± 35 ms. A successful procedure was defined as the presence of bidirectional isthmus conduction block under isoproterenol infusion and non-inducibility of AFL.
Results: All but one patient (95%) of the Single-3 group and all patients (100%) of the Double-3 group were successfully ablated. The mean temperature in the Single-3 group was -79 ± 6°C and in the Double-3 group -80 ± 4°C (NS). The number of sites needed to create isthmus conduction block was 9 ± 4 (Single-3) and 9 ± 2 (Double-3) (NS). Fluoroscopy time did not differ between both groups (Single-3: 31 ± 13 and Double-3: 36 ± 17 min, NS). The procedure time of the Single-3 group was significantly shorter compared to the procedure time of the Double-3 group (mean procedure duration 132 ± 64 versus 158 ± 50 minutes, p=0.04). After a mean follow-up of 8.2 ± 4.6 months, one recurrence of AFL occurred in the Double-3 group.
Conclusion: Single cryothermia applications of 3 minutes produce permanent cavotricuspid isthmus conduction block in patients with common AFL and significantly reduce the duration of the procedure.